CLAIMS

1. Process for smoothing a subsurface property in a geological structure represented by seismic measurements, in which there is constructed a continuous function $S_{ij,k}(t)$ by interpolation or approximation of the discrete seismic traces of a multi-dimensional seismic matrix, said function $S_{ij,k}(t)$ being designed as a "continuous local seismic trace", comprising the following steps:

a). using as optimum offset of two adjacent continuous local seismic traces $S_{ij,k}(t)$ and $S_{pq,k}(t)$, the value of offset rendering maximum their correlation function, this optimum offset not necessarily being a whole number multiple of the vertical sampling interval;

b). using as conditional neighborhood of a central continuous local seismic trace $S_{ij,k}(t)$ the sub-neighborhood consisting of adjacent traces $S_{pq,k}(t)$ corresponding to optimum offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold comprised between 0 and 1;

c). selecting a property of a subsurface to be smoothed in the conditional neighborhood of a point (i, j, k) of a reference "central" continuous local seismic trace;

d). offsetting the subsurface properties of the conditional neighborhood by translating the current variable of the value of optimum offset $h_{ij,pq,k}$;

e). taking as the smoothed value of the point (i, j, k) an average of the subsurface properties offset in step d).

2. Process according to claim 1, in which the average of the surface properties of step 3) is a weighted average, for example by the value of maximum correlation corresponding to the optimum offset.

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3. Process according to claim 1 or 2, in which the average of the subsurface properties of step e) is selected from the following set: arithmetic average, geometric average, harmonic average, weighted or not.

4. Process according to claim 1, in which there is selected as the subsurface property to be smoothed, the amplitude reflected and detected by geophones.

5. Process according to any one of the preceding claims, in which the process of smoothing is repeated by applying to the result a prior smoothing.

6. Process according to claim 1 or claim 5, in which a multi-dimensional matrix of smoothed property is visualized on a visualization screen.

7. Device for the practice of the process according to any one of claims 1 to 4, comprising means to utilize as optimum offset of two adjacent continuous local seismic traces, the value $h_{ij,pq,k}$ of offset rendering maximal their correlation function, means to offset the subsurface properties of the conditional neighborhood by translating the current variable of the value of optimum offset $h_{ij,pq,k}$, means to select a property of the subsurface to be smoothed in the conditional neighborhood of a point (i, j, k) of a reference central continuous local seismic trace, means to offset the subsurface properties of the conditional neighborhood by translating the current variable of the value of optimum offset $h_{ij,pq,k}$, and means to take as the smoothed value of the point (i, j, k) an average of the subsurface properties offset in step d).

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8. Device according to claim 7, comprising means for memorizing and means for visualizing seismic parameters determined with the help of the process according to any one of

5   claims 1 to 6.

9. Computer software package, comprising elements of program code to execute the steps of the process according to any one of claims 1 to 5, when said program is executed by a

10   computer.

10. Computer software package comprising elements of program code to execute the steps of the process according to claim 6, when said program is executed by a computer.

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